

## REMARKS

Entry of the foregoing amendments is respectfully requested.

### Summary of Amendments

By the foregoing amendments Tables 2-4 of the present specification are amended to change the dimension of the Falling Ball Impact Value from “cm<sup>2</sup>” to “cm”.

Support for these amendments can be found, for example, at page 19, lines 7-16 of the present specification.

The amendment to the first paragraph of page 51 (changing “0.922/ml” to “0.922 g/ml”) can be found, for example, at page 9, lines 1-4 of the present specification.

### Summary of Office Action

As an initial matter, Applicants note with appreciation that the Examiner has indicated consideration of the Information Disclosure Statement filed December 13, 2005 by returning a signed and initialed copy of the Form PTO-1449 submitted therein.

Applicants further note with appreciation that the present Office Action indicates that the claim for priority is acknowledged and that copies of certified copies of the priority documents have been received by the Patent and Trademark Office from the International Bureau.

Claims 1, 2 and 5 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over JP 1-284536 to Takasama et al. (hereafter “TAKASAMA”) in view of Wicher et al., U.S. Patent No. 6,608,150 (hereafter “WICHER”).

Claim 3 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA and WICHER in view of Senda et al., U.S. Patent No. 4,368,218 (hereafter "SENDA").

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA in view of WICHER and further in view of Smith et al., U.S. Patent No. 3,963,816 (hereafter "SMITH").

Claim 4 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA in view of SMITH.

Claims 1-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 4, 5, 6, 9-11 and 14 of co-pending application No. 10/540,866.

#### **Response to Office Action**

Withdrawal of the rejections of record is respectfully requested, in view of the following remarks.

#### ***Response to Rejection of Claims 1, 2 and 5 under 35 U.S.C. § 103(a)***

Claims 1, 2 and 5 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA in view of WICHER. The rejection essentially asserts that TAKASAMA discloses a method for producing expandable beads of a styrene-modified LLDPE-based resin which differs from the method recited in the rejected claims only in that it does not comprise a second polymerization of the styrene-based monomer.

In this regard, the rejection relies on WICHER, alleging that this document teaches a step-wise process for polymerizing styrene monomer using two different temperature ranges and that one of ordinary skill in the art would have been motivated to combine the teachings of TAKASAMA and WICHER, thereby arriving at the subject matter of claims 1, 2 and 5.

Applicants respectfully traverse this rejection. Initially, it is submitted that TAKASAMA fails to teach or suggest a two-step polymerization of excess styrene-based monomer in the modification of LLDPE beads. In this regard it is pointed out that, if excess styrene-based monomer is polymerized in one step, a large amount of styrene homopolymer powder is produced, as illustrated in Comparative Example 8 at pages 46/47 of the present specification. Therefore the claimed process, producing a smaller amount of homopolymer powder than the process of TAKASAMA, is more advantageous than the process of TAKASAMA. In this regard, it is noted that TAKASAMA is an unexamined Patent Publication corresponding to Japanese Patent No. 2668384 which is discussed in the passage from page 2, line 21 to page 4, line 9 of the present specification.

At any rate, the unexpected effect that by carrying out the polymerization of TAKASAMA in two steps as set forth in present claim 1 it is possible to reduce the amount of styrene homopolymer which is formed during this process is neither taught nor suggested by TAKASAMA or WICHER.

Applicants further submit that, contrary to what is asserted in the present Office Action, there is no apparent reason for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER. Specifically, TAKASAMA is concerned with the polystyrene-modification of pre-formed beads of a LLDPE-based resin, i.e., a grafting reaction, whereas WICHER is concerned with the production of beads made by a

homopolymerization of styrene. WICHER does not mention any pre-formed beads at all, let alone beads of a resin which is completely different from polystyrene, such as LLDPE-based resin beads.

In other words, in contrast to TAKASAMA, WICHER does not describe the use of LLDPE-based beads but relates to expandable polystyrene beads. Accordingly, due to the fundamental differences in the teachings of TAKASAMA and WICHER, it is impossible to combine these teachings. Moreover, WICHER fails to teach or suggest to impregnate and polymerize styrene twice in separate steps. Additionally, neither TAKASAMA nor WICHER teach or suggest the possibility of polymerizing a styrene-based monomer in two steps to obtain modified beads which are rich in polystyrene.

Further, even if one were to assume, *arguendo*, that there is an apparent reason for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER, this combination would not result in the claimed subject matter. For example, while in the claimed process the styrene-based monomer is added in two portions to the polymerization reactor, the second portion being added only after a conversion of from 80 to 99.9 % of the first portion has been achieved, WICHER employs the entire styrene already at the beginning of the polymerization and polymerizes the styrene by using two different polymerization initiators which are present from the beginning of the polymerization and are activated at different temperatures.

Additionally, even if one were to assume that the polymerization of WICHER proceeds in two defined stages it is unknown what the percent conversion of styrene is when the first stage is completed and the second polymerization initiator is activated. In view thereof, it is also unknown what the amount of second initiator per 100 parts of

remaining styrene at the beginning of the second stage is. Applicants note that the present Office Action fails to address these issues.

Applicants further note that the present rejection fails to explain why when combining the teachings of TAKASAMA and WICHER, one of ordinary skill in the art would employ the temperature conditions of WICHER for the second stage but not the temperature conditions for the first stage of the polymerization of WICHER.

Regarding the percentage of gel component (2-40 wt.-%) recited in present claims 1 and 5, the Examiner's attention is directed to the results summarized in Tables 1 and 2 at pages 49 and 50 of the present application. These results show that the gel content is strongly dependent on the specific reaction conditions employed in the first and second polymerization (temperature, conversion after first polymerization, amount and type of initiator(s) used), wherefore it cannot reasonably be assumed that the percentage of gel component recited in claim 1 would automatically be achieved by using the process of TAKASAMA as modified (in whichever respect) by the teaching of WICHER.

Applicants also respectfully submit that the assertion set forth at the end of page 4 of the present Office Action is clearly based on hindsight and thus without merit. Merely because WICHER teaches a two-stage homopolymerization of styrene (but without employing the styrene in two portions) there is no apparent reason for one of ordinary skill in the art to exceed the amount of styrene-based monomer beyond 300 parts by weight in an assumed two-stage graft copolymerization according to TAKASAMA.

It is submitted that for at least all of the foregoing reasons, the rejection of claims 1, 2 and 5 under 35 U.S.C. 103(a) over TAKASAMA in view of WICHER is unwarranted and should be withdrawn, which action is respectfully requested.

***Response to Rejection of Claim 3 under 35 U.S.C. § 103(a)***

Claim 3 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA and WICHER in view of SENDA.

Applicants submit that claim 3 is dependent from claim 1, wherefore claim 3 is not rendered obvious by the cited documents for at least all of the reasons which are set forth above with respect to claims 1, 2 and 5. In view thereof, Applicants refrain from commenting on the allegations with respect to claim 3 which are set forth in the present Office Action, without admitting however, that any of these allegations is meritorious.

***Response to Rejection of Claims 8 and 9 under 35 U.S.C. § 103(a)***

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA in view of WICHER and further in view of SMITH.

Applicants note that claims 8 and 9 are (ultimately) dependent from claim 5. As has been set forth above, the beads recited in claim 5 (obtained by the process of claim 1) are not rendered obvious by TAKASAMA in view of WICHER, wherefore claims 8 and 9 are not rendered obvious by the cited documents for at least all of the reasons which are set forth above with respect to claim 5 (and claim 1). In view thereof, Applicants refrain from commenting on the allegations with respect to claims 8 and 9 which are set forth in the present Office Action, without admitting however, that any of these allegations is meritorious.

***Response to Rejection of Claim 4 under 35 U.S.C. § 103(a)***

Claim 4 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA.

Applicants respectfully traverse this rejection as well. In particular, it is submitted that the expandable beads of TAKASAMA differ from the claimed beads at least in that the latter contain more than 300 parts by weight of polystyrene-based resin component relative to 100 parts by weight of non-crosslinked LLDPE beads. In this regard, it is noted that according to page 4, lines 4-9 of the present specification, increasing the amount of styrene monomer in the process of TAKASAMA to more than 300 parts by weight relative to 100 parts by weight of polyethylene beads results in the formation of a large amount of styrene homopolymer (see also Comparative Example 8 at pages 46/47 of the present specification). Accordingly, the claimed expandable beads are not rendered obvious by TAKASAMA because the increased amount of styrene homopolymer formed together with the styrene-modified beads obtained according to the process of TAKASAMA would discourage one of ordinary skill in the art to use more than 300 parts by weight of styrene-based monomer relative to 100 parts by weight of polyethylene beads in the process of TAKASAMA. This is also supported by the disclosure of TAKASAMA which teaches using a maximum of 300 parts by weight of vinylaromatic monomer (styrene) per 100 parts by weight of polyethylene beads.

In view of the foregoing it is submitted that TAKASAMA fails to render obvious the beads of present claim 4, wherefore withdrawal of the rejection of claim 4 under 35 U.S.C. 103(a) over TAKASAMA is warranted and respectfully requested.

***Response to Rejection of Claims 6 and 7 under 35 U.S.C. § 103(a)***

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over TAKASAMA in view of SMITH.

It is submitted that claims 6 and 7 are (ultimately) dependent from claim 4. As set forth above, the beads recited in claim 4 are not rendered obvious by TAKASAMA, wherefore claims 6 and 7 are not rendered obvious by the cited documents for at least all of the reasons which are pointed out above with respect to claim 4. In view thereof, Applicants refrain from commenting on the allegations with respect to claims 6 and 7 which are set forth in the present Office Action, without admitting however, that any of these allegations is meritorious.

***Response to Provisional Rejection of Claims 1-9 on the Ground of Nonstatutory Obviousness-Type Double Patenting***

Claims 1-9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 4, 5, 6, 9-11 and 14 of co-pending application No. 10/540,866.


This rejection is respectfully traversed as well. Applicants note that the Examiner has not provided any explanation at all as to why the present claims allegedly are obvious variants of certain claims of the co-pending application. Specifically, the Examiner has not commented on the differences in the claimed methods as to, e.g., polymerization temperature, content of gel component and one-step vs. two step polymerization.



## CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are in condition for allowance, which action is respectfully requested. If any issues yet remain which can be resolved by a telephone conference, the Examiner is respectfully invited to contact the undersigned at the telephone number below.

Respectfully submitted,  
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